

Attorney Docket: 2101/50769
PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: NIGEL B. ALDRIDGE ET AL.
Serial No.: NOT YET ASSIGNED PCT No.: PCT/GB01/00035
Filed: MARCH 19, 2002
Title: IMPROVEMENTS RELATING TO INTERFACING OPTICAL
TRANSMISSION STRUCTURES

PRELIMINARY AMENDMENT

Box PCT
Commissioner for Patents
Washington, D.C. 20231

March 19, 2002

Sir:

Please enter the following amendments to the claims, prior to the examination of the application during the U.S. National Phase.

IN THE CLAIMS:

Please cancel Claim 29, without prejudice to or disclaimer of the subject matter thereof and amend the remaining claims as follows: (A copy of a marked up version with markings to show changes made is attached hereto.)

4. (Amended) A composite according to Claim 2, further comprising means for preventing laser irradiation light used in the formation of the passageway from being optically coupled with the optical transmission means.

6. (Amended) A composite according to Claim 4, wherein the preventing means comprises at least one wavelength selective mirror or beam splitter and a light beam absorbing means embedded at an appropriate position within the carrier.

7. (Amended) A composite according to Claim 1, further comprising detectable locating means arranged to be used in locating the position of the high-quality optical surface from the exterior of the carrier.

9. (Amended) A composite according to Claim 7, further comprising a depth marker embedded within the composite to indicate when the passageway has been formed to the correct depth.

10. (Amended) A composite according to Claim 9, wherein the depth marker comprises the position marker.

11. (Amended) A composite according to Claim 7, wherein the position marker or the depth marker comprises a sacrificial coating which is arranged to be removable after the formation of the passageway to access the optical transmission means.

14. (Amended) A composite according to Claim 1, wherein the optical interface surface comprises at thermally expanded core optical fibre connected to the optical transmission means.

15. (Amended) A composite according to Claim 1, further comprising an alignment structure embedded within the carrier for aligning an interface means with the optical transmission means via the optical interface surface.

16. (Amended) A composite according to Claim 1, further comprising optical processing means embedded within the carrier, the optical processing means being optically connected to the optical transmission means for processing light to or from the optical transmission means and providing the optical interface surface.

19. (Amended) A composite according to Claim 16, wherein the optical processing means comprise means for collimating a light beam.

21. (Amended) A composite according to Claim 16, wherein the optical processing means comprises at least one of the group comprising an optical grating element, a wave-guide, a wave plate, a hologram and an optical filter.

22. (Amended) A composite according to Claim 16, further comprising a micro-substrate on which the optical processing means is provided and secured to the optical transmission means.

23. (Amended) A composite according to Claim 22, wherein the alignment structure is provided on the micro-substrate.

24. (Amended) A composite according to Claim 1, wherein the optical transmission means comprises an elongate structure and the optical interface surface is provided at a side of the elongate structure.

28. (Amended) A composite according to Claim 1, wherein the optical transmission means comprises an optical fibre.

(Applicant's Remarks are set forth hereinbelow, starting on the following page.)


REMARKS

Entry of the amendments to the claims, before examination of the application in the U.S. National Phase is respectfully requested.

If there are any questions regarding this amendment or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an Extension of Time sufficient to effect a timely response, and please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket #2101/50769).

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO THE CLAIMS

4. (Amended) A composite according to Claim 2, [or 3,] further comprising means for preventing laser irradiation light used in the formation of the passageway from being optically coupled with the optical transmission means.

6. (Amended) A composite according to Claim 4, [or 5,] wherein the preventing means comprises at least one wavelength selective mirror or beam splitter and a light beam absorbing means embedded at an appropriate position within the carrier.

7. (Amended) A composite according to [any preceding claim,] Claim 1, further comprising detectable locating means arranged to be used in locating the position of the high-quality optical surface from the exterior of the carrier.

9. (Amended) A composite according to Claim 7, [or 8 as dependent on any of Claims 4 to 6,] further comprising a depth marker embedded within the composite to indicate when the passageway has been formed to the correct depth.

10. (Amended) A composite according to Claim 9, [as dependent on Claim 8,] wherein the depth marker comprises the position marker.

11. (Amended) A composite according to [any of Claims 7 to 10 as dependent from any of Claims 2 to 6,] Claim 7, wherein the position marker or the depth marker comprises a sacrificial coating which is arranged to be removable after the formation of the passageway to access the optical transmission means.

14. (Amended) A composite according to [any preceding claim,] Claim 1, wherein the optical interface surface comprises at thermally expanded core optical fibre connected to the optical transmission means.

15. (Amended) A composite according to [any preceding claim,] Claim 1, further comprising an alignment structure embedded within the carrier for aligning an interface means with the optical transmission means via the optical interface surface.

16. (Amended) A composite according to [any preceding claim,] Claim 1, further comprising optical processing means embedded within the carrier, the optical processing means being optically connected to the optical transmission means for processing light to or from the optical transmission means and providing the optical interface surface.

19. (Amended) A composite according to [any of Claims 16 to 18,] Claim 16, wherein the optical processing means comprise means for collimating a light beam.

21. (Amended) A composite according to [any of Claims 16 to 20,] Claim 16, wherein the optical processing means comprises at least one of the group comprising an optical grating element, a wave-guide, a wave plate, a hologram and an optical filter.

22. (Amended) A composite according to [any of Claims 16 to 21,] Claim 16, further comprising a micro-substrate on which the optical processing means is provided and secured to the optical transmission means.

23. (Amended) A composite according to Claim 22, [as dependent on Claim 15,] wherein the alignment structure is provided on the micro-substrate.

24. (Amended) A composite according to [any preceding claim,] Claim 1, wherein the optical transmission means comprises an elongate structure and the optical interface surface is provided at a side of the elongate structure.

28. (Amended) A composite according to [any preceding claim,] Claim 1, wherein the optical transmission means comprises an optical fibre.

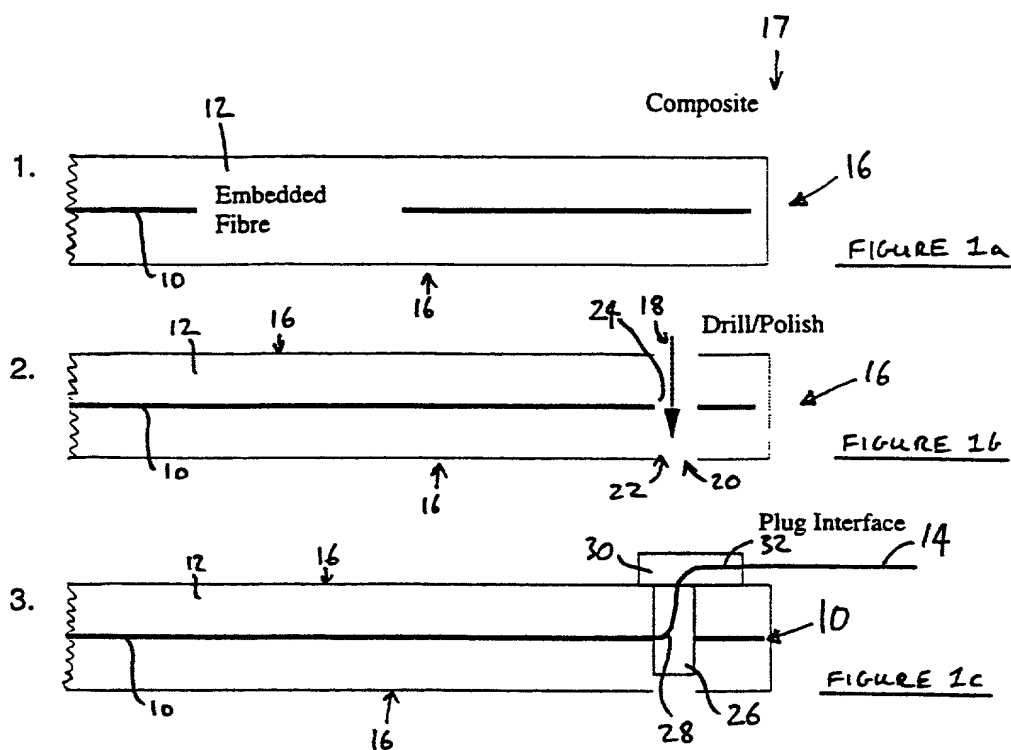


Figure 1. Concept of drilling through composite to find the embedded fibre. The fibre could be polished to reinstate an optical finish. External connections could then be made with a connector plug. Alignment could be controlled within the plug.

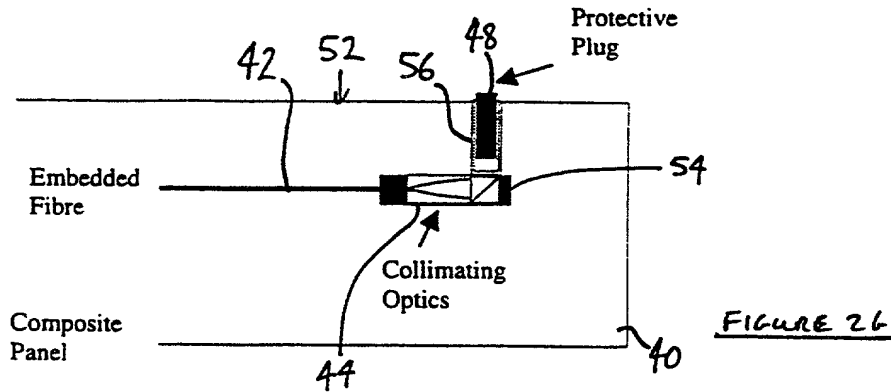
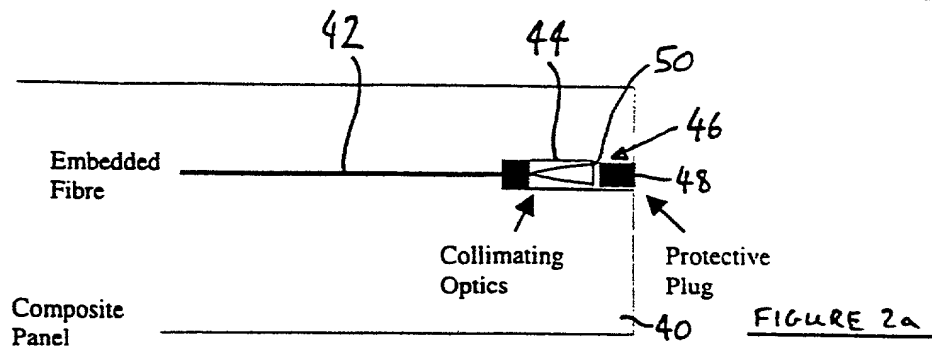


Figure 2. Schematic concepts for edge and surface embedded optical ports to embedded fibres. Protective plugs could protect the ports during composite manufacture.

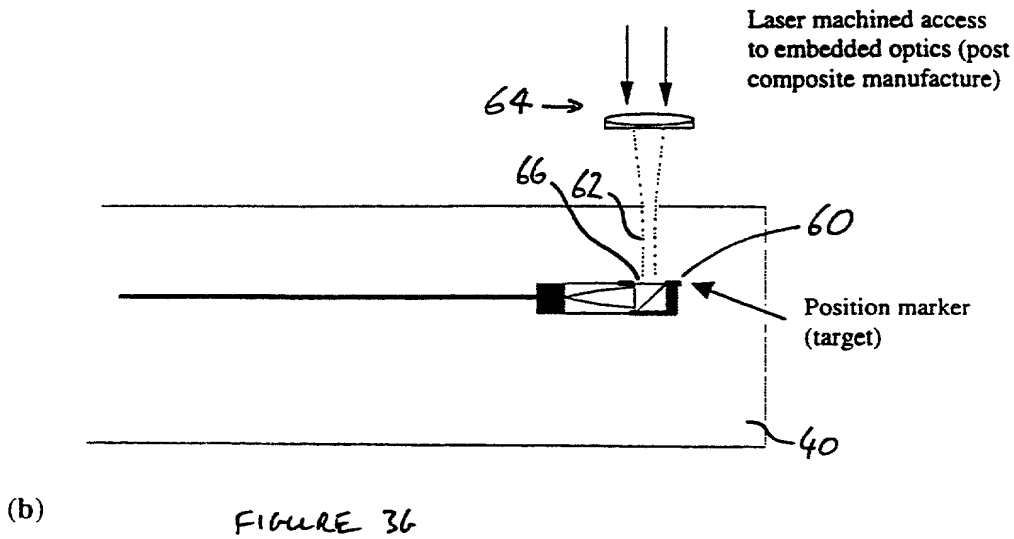
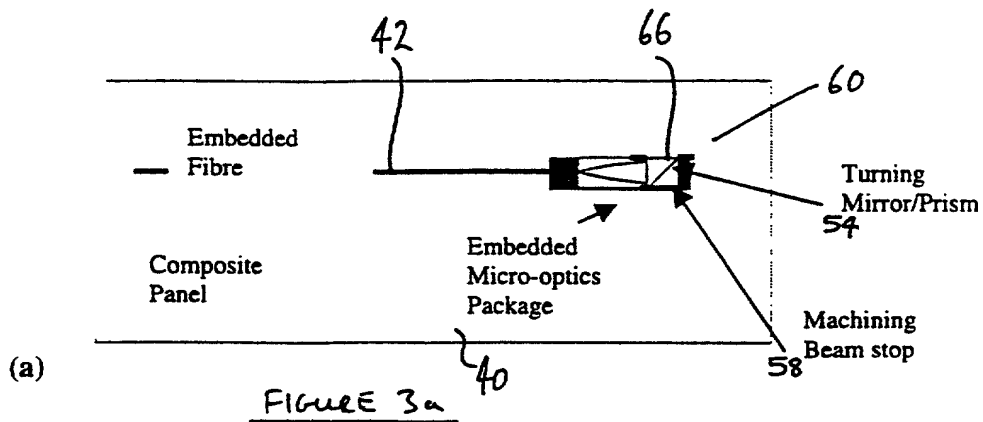


Figure 3. Potential concept to embed micro-optics within a composite panel (a). The optics could be accessed for interfacing after composite manufacture, possibly by precision laser machining (b). Connectors or fibres could be interfaced to the exposed micro-optical surface. Interfacing at the composite surface or edge (depending on the embedded optics package) may be possible.

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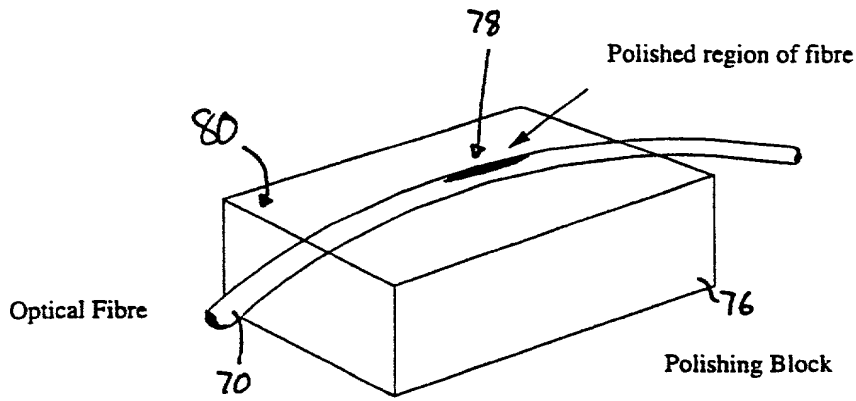


FIGURE 4a

Side view

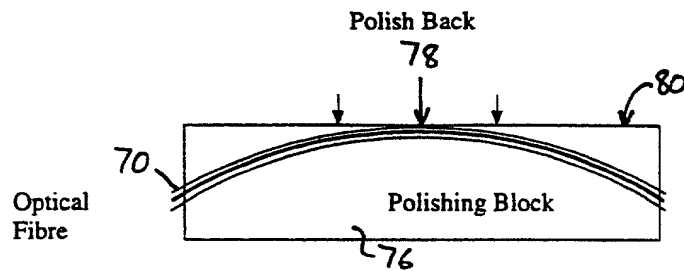


FIGURE 4b

Figure 4. Polishing of an optical fibre to form an evanescent coupler. Evanescent coupling could allow side coupling into embedded fibres, post-manufacture, by exposing an embedded coupler near the composite surface.

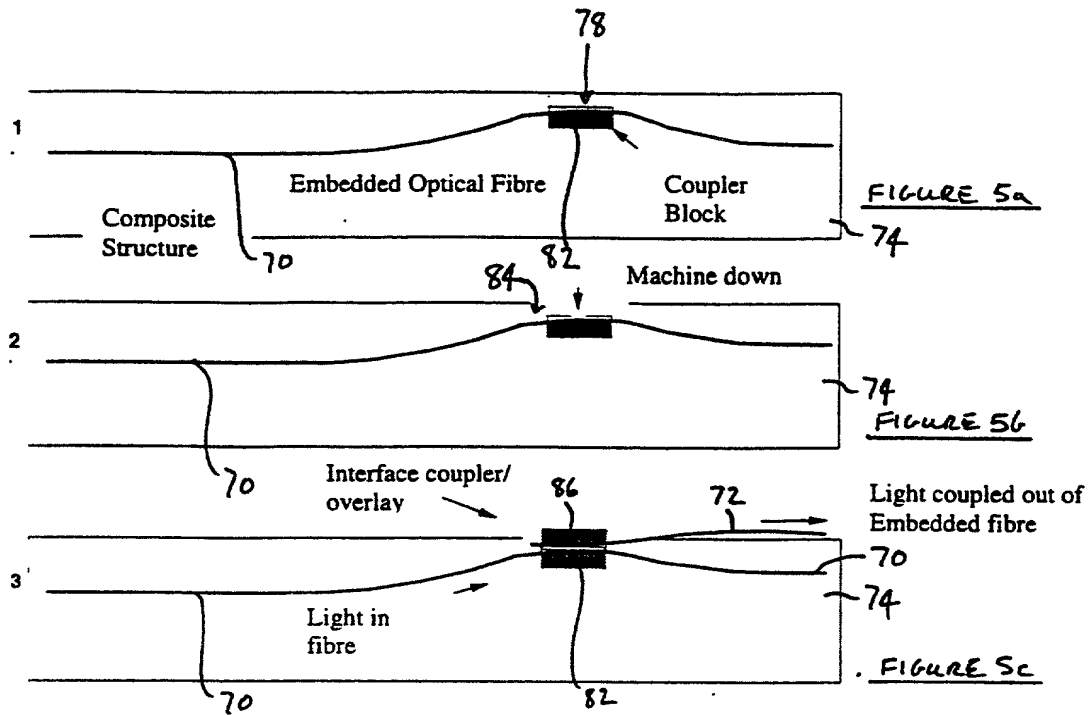
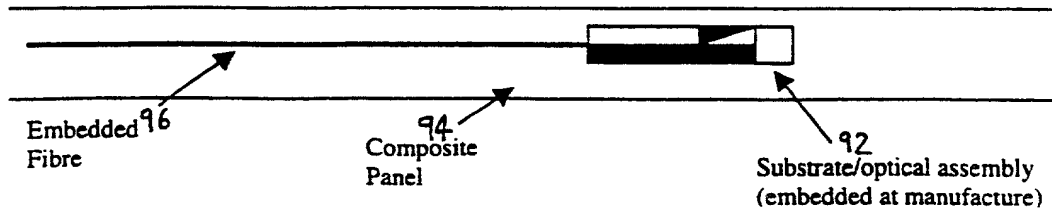


Figure 5. Schematic of evanescent interface formed by machining down to an embedded evanescent coupler structure (post manufacture).

(a) Side view

FIGURE 6a

(b) Top view (note structure is buried)

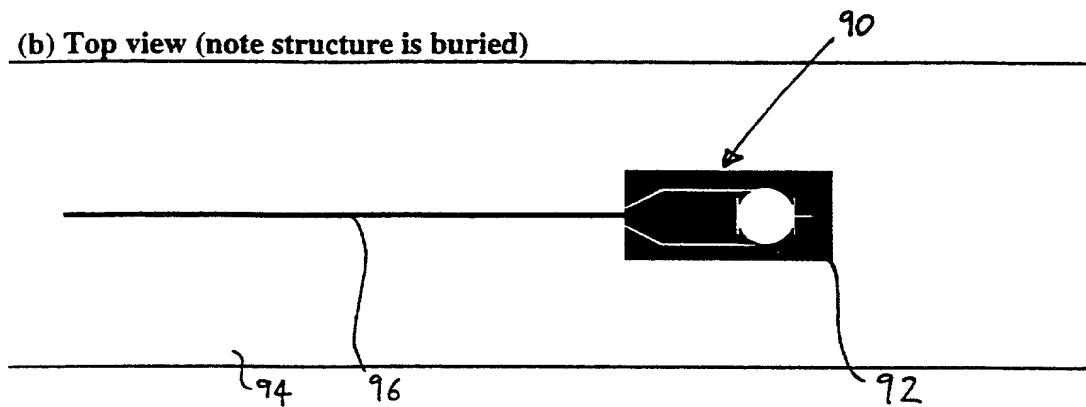
FIGURE 6b

Figure 6 Embedded fibre and substrate assembly. Such an assembly could comprise a number of optical processing elements.